

REMARKS

The application has been reviewed in light of the Non-Final Office Action mailed August 4, 2005. At the time of the Non-Final Office Action, claims 1-24 were pending in this application.

Claims 1- 24 stand rejected in view of prior art. For the reasons discussed below, Applicants believe that all of the remaining claims are patentable over the cited prior art, and therefore respectfully traverse Examiner's rejection.

I. Rejection under 35 U.S.C. § 103(a)

Claims 1-24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over either U.S. Patent 6,510,947 issued to Schulte *et al.* [hereinafter *Schulte*] or U.S. Patent Publication 2003/0132141 issued to Adams *et al.* [hereinafter *Adams*] in the alternative in view of U.S. Patent 5,842,522 issued to Echols *et al.* [hereinafter *Echols*].

A. The Cited References Do Not Teach All Claim Limitations of Applicants' Claims

A prima facie case of obviousness requires a showing that all claim limitations be taught or suggested by the art. M.P.E.P. § 2143.03. Applicants respectfully submit the combination of *Schulte*, *Adams*, and *Echols* fail to yield a process within the scope of the claims. *Schulte*, *Adams*, and *Echols* fail to form a proper basis for a prima facie case of obviousness, because they fail to teach all of the limitations of the claimed invention.

In particular, as to independent claims 1, 11, and 18, the cited references fail to teach or suggest a shale shaker screen or vibrating screen that is "formed of the same screen used to form the downhole sand control screen" where such screen is "formed of a plurality of layers of screens that have been diffusion-bonded together." Accordingly, the cited references cannot form a proper basis for a prima facie case of obviousness.

The Examiner notes that the screen metallurgy of *Echols* can be the same metallurgy as that of *Schulte* and *Adams* as follows:

It is noted that since the screen material of *Echols* et al. the screen material of *Schulte* et al. and *Adams* et al. is formed of the same type of screen material used to form the sand control screen as recited.

See Office Action at 3. Applicants recognize that the type of metal used in *Echols* may also be used in some embodiments of the shale shakers in *Schulte* and *Adams*. The type of metal used, however, is only one aspect of the screen. Another aspect of the “downhole control screen” is that it is comprised of “a plurality of layers of screens.” Nowhere in any of the cited references do the references teach that the screen used in the “shale shaker screen” of independent claims 1 and 11 or that the “vibrating screen” of independent claim 11 should be formed of the same screen as in the “downhole control screen” where the “downhole control screen” is “formed of a plurality of layers of screens.”

In other words, merely showing that the type of metallurgy used may coincide in certain embodiments of the screens of the cited references is not sufficient in itself to form an appropriate basis for an obviousness rejection. Each and every limitation of the claims must be taught or suggested by the prior art to form a proper basis for an obviousness rejection. M.P.E.P. § 2143.03. In this case, the cited references fail to show that the “shale shaker screen” of independent claims 1 and 11 or that the “vibrating screen” of independent claim 11 should be formed of the same screen as used in a “downhole control screen” where the “downhole control screen” is “formed of a plurality of layers of screens.”

Accordingly, the cited references fail to make obvious Applicants’ claims. As such, Applicants respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection as to independent claims 1, 11, and 18 and correspondingly, dependent claims thereof, 2-10, 12-17, and 19-24.

Furthermore, as to independent claims 1, 11, and 18, the cited references fail to teach “a downhole sand control screen formed of a plurality of layers of screens *that have been diffusion-bonded together*” (emphasis added). Accordingly, the cited references cannot form a proper basis for a prima facie case of obviousness.

Applicants recognize that one or more of the cited references teaches sintering screen layers together. Applicants respectfully submit, however, that the term “sintering” describes a process that is different from “diffusion bonding.” As shown by a dictionary, sintering means “forming a coherent bonded mass by heating metal powders without melting,” whereas diffusion bonding refers to “a . . . process for joining metals by using only heat and pressure to achieve atomic bonding.” See e.g., MCGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS 604, 1492 (6th ed. 2003) (courtesy copy enclosed). The disclosure of the present application illustrates that the term diffusion bonding refers to the joining of metals by the use of both heat and pressure. See *Present Application*, para. 33 at 12 (showing an example in which the screens are joined by using pressures of “approximately 100 - 500 lbs” with heat that results in temperatures of “approximately 2200°F.”). Thus, the term “sintering,” which is a process that involves the application of only heat without pressure is not the same as the process of “diffusion-bonding,” which involves the application of both heat and pressure. Accordingly, a disclosure of “sintering” does not amount to a teaching or suggestion of “diffusion-bonding.”

Therefore, none of the cited references alone or in combination teach or suggest each and every element of all of the pending claims, namely a shale shaker or vibrating screen “formed of the same screen used to form the downhole sand control screen” and where such screen is “formed of a plurality of layers of screens that have been diffusion-bonded together.” (emphasis added) As such, the rejections of independent claims 1, 11, and 18 and corresponding

dependent claims 2-10, 12-17, and 19-24 under 35 U.S.C. § 103(a) are unsupported and therefore should be withdrawn.

B. No Motivation to Combine the Cited References Exist in the Cited References

A prima facie case of obviousness requires a suggestion or motivation in the prior art references to make the specific combination of elements claimed by Applicants. M.P.E.P. § 2143.01 (citing *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998) (The combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a prima facie case of obvious was held *improper*.); *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308 (Fed. Cir. 1999) (The level of skill in the art cannot be relied upon to provide the suggestion to combine references.)). The cited prior art references contain no such motivation or suggestion to combine the elements of *Schulte*, *Adams*, and *Echols* to arrive at the specific combination of elements claimed by Applicants.

The Examiner writes, in part, as follows:

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a sand control screen as taught by Echols et al. in the wellbore of Schulte et al. or Adams et al. when the well is placed in production to prevent the production of sand as taught by Echols et al. (See col. 1, lines 13-29).

Alternatively, it would also have been obvious to use a shale shaker screen as taught by Schulte et al. or Adams et al. during the drilling operation to drill the wellbore of Echols et al. in order to remove solids from the drilling mud to minimize wear on mud pumps and other mechanical equipment used for drilling (See col. 1, lines 35-55 in Schulte et al. and paragraph [0011] in Adams et al.).

See *Office Action* at 2-3. Applicants respectfully submit that the Examiner has not pointed to any suggestion or motivation to combine the teachings of *Schulte*, *Adams*, and *Echols* that is present in the cited references themselves. The Examiner has provided no evidence or finding of the specific understanding or principle within the knowledge of a person of ordinary skill in the art at

the time of the invention that would have supplied the motivation to combine the cited references. *See* M.P.E.P. § 2143.01.

Further, as provided in M.P.E.P. § 2144.03(C), a conclusion as to the supposed action of a person of ordinary skill in the art is insufficient to establish a *prima facie* case of obviousness. To the extent that Examiner relies on such a statement or statements to supply the necessary motivation to combine or modify the prior art references, Applicants hereby respectfully traverse the lack of such a showing and request under M.P.E.P. § 2144.03(C) that the Examiner supply an affidavit or other documentary proof establishing the prior art knowledge that would have motivated a person of ordinary skill in the art to make the specific modification and/or combination of elements to arrive at Applicants' invention.

Additionally, Applicants respectfully point out that the Federal Circuit has made clear that "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." M.P.E.P. § 2143.01 (citing *In re Mills*, 916 F.2d 680,682 (Fed. Cir. 1990)). The M.P.E.P. also makes clear the requirement that the Examiner provide objective reasons to combine the references apart from naked statements that "it would be obvious to a person of ordinary skill." M.P.E.P. § 2143.01 (explaining that "A statement that modifications of the prior art to meet the claimed invention would have been 'well within the ordinary skill of the art' at the time the claimed invention was made' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references." (citations omitted)).

Thus, Applicants respectfully submit that it is inappropriate to combine *Schulte*, *Adams*, and *Echols*. Further, the references contain no suggestion or motivation to combine or to

modify the references to arrive at the specific combination of elements of the present invention. Thus, Applicants respectfully request the removal of the 35 U.S.C. § 103(a) rejection as to the independent claims 1, 11, and 18, and correspondingly, dependent claims 2-10, 12-17, and 19-24.

SUMMARY

In light of the above amendments and remarks, Applicants respectfully submit that the application is now in condition for allowance and early notice of the same is earnestly solicited. Should the Examiner have any questions, comments or suggestions in furtherance of the prosecution of this application, the Examiner is invited to contact the attorney of record by telephone, facsimile or electronic mail, as indicated below.

Applicants believes that no fees are due in association with the filing of this Response. However, should the Commissioner deem that any fees are due, including any fees for any extensions of time, Applicants respectfully request that the Commissioner accept this as a Petition therefore, and directs that any fees be debited from Baker Botts L.L.P., Deposit Account No. 02-0383, (*formerly Baker & Botts, L.L.P.*) Order Number 063718.0303.

Respectfully submitted,

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On the cover: Representation of a fullerene molecule with a noble gas atom trapped inside. At the Permian-Triassic sedimentary boundary the noble gases helium and argon have been found trapped inside fullerenes. They exhibit isotope ratios quite similar to those found in meteorites, suggesting that a fireball meteorite or asteroid exploded when it hit the Earth, causing major changes in the environment. (Image copyright © Dr. Luann Becker. Reproduced with permission.)

Over the six editions of the Dictionary, material has been drawn from the following references: G. M. Garrity et al., *Taxonomic Outline of the Prokaryotes*, Release 2, Springer-Verlag, January 2002; D. W. Linzey, *Vertebrate Biology*, McGraw-Hill, 2001; J. A. Pechenik, *Biology of the Invertebrates*, 4th ed., McGraw-Hill, 2000; U.S. Air Force Glossary of Standardized Terms, AF Manual 11-1, vol. 1, 1972; F. Casey, ed., *Compilation of Terms in Information Sciences Technology*, Federal Council for Science and Technology, 1970; *Communications-Electronics Terminology*, AF Manual 11-1, vol. 3, 1970; P. W. Thrush, comp. and ed., *A Dictionary of Mining, Mineral, and Related Terms*, Bureau of Mines, 1968; *A DOD Glossary of Mapping, Charting and Geodetic Terms*, Department of Defense, 1967; J. M. Gilliland, *Solar-Terrestrial Physics: A Glossary of Terms and Abbreviations*, Royal Aircraft Establishment Technical Report 67158, 1967; W. H. Allen, ed., *Dictionary of Technical Terms for Aerospace Use*, National Aeronautics and Space Administration, 1965; *Glossary of Stinfo Terminology*, Office of Aerospace Research, U.S. Air Force, 1963; *Naval Dictionary of Electronic, Technical, and Imperative Terms*, Bureau of Naval Personnel, 1962; R. E. Huschke, *Glossary of Meteorology*, American Meteorological Society, 1959; *ADP Glossary*, Department of the Navy, NAVSO P-3097; *Glossary of Air Traffic Control Terms*, Federal Aviation Agency; *A Glossary of Range Terminology, White Sands Missile Range, New Mexico*, National Bureau of Standards, AD 467-424; *Nuclear Terms: A Glossary*, 2d ed., Atomic Energy Commission.

McGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS, Sixth Edition

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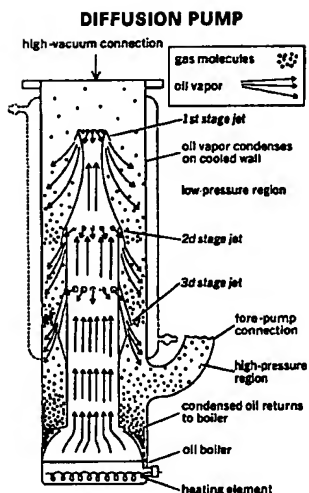
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Main operating features of diffusion pump.

diffusion barrier [CHEM ENG] Porous barrier through which gaseous mixtures are passed for enrichment of the lighter-molecular-weight constituent of the diffusate; used as a many-stage cascade system for the recovery of $^{235}\text{UF}_6$ isotopes from a $^{238}\text{UF}_6$ stream. {dǎ'fū·zhān ,bā·è·èr }

diffusion bonding [MET] A solid-state process for joining metals by using only heat and pressure to achieve atomic bonding. {dǎ'fū·zhān ,bānd·īng }

diffusion brazing [MET] A process which produces bonding of the faying surfaces by heating them to suitable temperatures; the filler metal is diffused with the base metal and approaches the properties of the base metal. Also known as transient liquid phase-bonding. {dǎ'fū·zhān ,brāz·īng }

diffusion capacitance [ELECTR] The rate of change of stored minority-carrier charge with the voltage across a semiconductor junction. {dǎ'fū·zhān kǎ'pās·ād·əns }

diffusion cloud chamber [NUCLEO] A cloud chamber in which vapor diffuses from a source near a hot plate and condenses on a cold plate; the resulting layer of supersaturated vapor between the plates is sensitive to the passage of ionizing particles. {dǎ'fū·zhān 'klāud ,chām·bōr }

diffusion coating [MET] An alloy coating produced by allowing the coating material to diffuse into the base at high temperature. {dǎ'fū·zhān ,kōd·īng }

diffusion coefficient [PHYS] The weight of a material, in grams, diffusing across an area of 1 square centimeter in 1 second in a unit concentration gradient. Also known as diffusivity. {dǎ'fū·zhān ,kō·ī'fīsh·ənt }

diffusion constant [SOLID STATE] The diffusion current density in a homogeneous semiconductor divided by the charge carrier concentration gradient. {dǎ'fū·zhān ,kǎn·stānt }

diffusion current [ANALY CHEM] In polarography with a dropping-mercury electrode, the flow that is controlled by the rate of diffusion of the active solution species across the concentration gradient produced by the removal of ions or molecule at the electrode surface. {dǎ'fū·zhān ,kǎr·ənt }

diffusion diagram [METEOROL] A diagram for displaying the comparative properties of various diffusion processes, with coordinates of the mean free path or mixing length and mean molecular speed or diffusion velocity, for molecular or eddy diffusion, respectively; each point of the diagram determines diffusivity. {dǎ'fū·zhān ,dr·ə·grām }

diffusion diameter [STAT MECH] For a gas, the diameter of identical hard spheres that display the same diffusion as that observed for the molecules of the actual gas when their motion is treated classically. {dǎ'fū·zhān ,dī·ām·əd·ər }

diffusion disk [OPTICS] A piece of transparent material that is marked or embossed, and is used with a camera lens to give the image a hazy softened quality. Also known as diffusing disk. {dǎ'fū·zhān ,dīsk }

diffusion equation [PHYS] 1. An equation for diffusion which states that the rate of change of the density of the diffusing substance, at a fixed point in space, equals the sum of the diffusion coefficient times the Laplacian of the density, the amount of the quantity generated per unit volume per unit time, and the negative of the quantity absorbed per unit volume per unit time. 2. More generally, any equation which states that the rate of change of some quantity, at a fixed point in space, equals a positive constant times the Laplacian of that quantity. {dǎ'fū·zhān ,ī'kwā·zhān }

diffusion extraction [FOOD ENG] Extraction of juice by countercurrent flow of hot water through fruit slices. {dǎ'fū·zhān ,īk·strāk·shān }

diffusion flame [CHEM] A long gas flame that radiates uniformly over its length and precipitates free carbon uniformly. {dǎ'fū·zhān ,flām }

diffusion gradient [PHYS] The graphed distance of penetration (diffusion) versus concentration of the material (or effect) diffusing through a second material; applies to heat, liquids, solids, or gases. {dǎ'fū·zhān ,grād·ē·ənt }

diffusion hygrometer [ENG] A hygrometer based upon the diffusion of water vapor through a porous membrane; essentially, it consists of a closed chamber having porous walls and containing a hygroscopic compound, whose absorption of water vapor causes a pressure drop within the chamber that is measured by a manometer. {dǎ'fū·zhān ,hī·grām·əd·ər }

diffusion kernel [NUCLEO] The neutron flux resulting from a point source emitting one neutron per second; it is a function

of the distance between the source and the point where it is measured. {dǎ'fū·zhān ,kǎr·nəl }

diffusion length [PHYS] The average distance traveled by a particle, such as a minority carrier in a semiconductor, from the point at which it is formed to the point at which it is absorbed. {dǎ'fū·zhān ,lɛŋkθ }

diffusion-limited aggregation [PHYS] A mathematical model for particle aggregation processes, such as the growth of a metal deposit on an electrochemical cell, in which particles move according to a random walk process until they are a certain fixed distance from the current aggregate, when they stick to it. {dǎ'fū·zhān ,līm·əd·əd·āg·rə·gā·shān }

diffusion-limited current density [MET] The density corresponding to the maximum transfer rate that a material can sustain due to diffusion limits. {dǎ'fū·zhān ,līm·əd·əd·ənt ,dɛn·səd·ē }

diffusion number [FL MECH] A dimensionless number in the study of mass transfer, equal to the diffusivity of a gas through a stationary solution contained in the solid, divided by the characteristic time, divided by the square of the distance from the midpoint of the solid to the surface. Symbolized by N . {dǎ'fū·zhān ,nəm·bōr }

diffusion plant [NUCLEO] A plant which separates isotopes by isotopic diffusion or thermal diffusion. {dǎ'fū·zhān ,plānt }

diffusion potential [PHYS CHEM] A potential difference across the boundary between electrolytic solutions with different compositions. Also known as liquid junction potential. {dǎ'fū·zhān ,pə·tɛn·chəl }

diffusion pump [ENG] A vacuum pump in which a stream of heavy molecules, such as mercury vapor, carries gas molecules out of the volume being evacuated; also used for separating isotopes according to weight, the lighter molecules being pumped preferentially by the vapor stream. {dǎ'fū·zhān ,pʌmp }

diffusion respiration [PHYSIO] Exchange of gases through the cell membrane, between the cells of unicellular or simple organisms and the environment. {dǎ'fū·zhān ,rɛs·pə·rā·shən }

diffusion theory [ELEC] The theory that in semiconductors where there is a variation of carrier concentration, the motion of the carriers is produced by diffusion in addition to that determined by the mobility and the electric field. {dǎ'fū·zhān ,thē·ə·rē }

diffusion-transfer process [GRAPHICS] Any of a series of photographic processes for copying documents in which a copy is produced by developing a photographic image, transferring by diffusion the silver salts in undeveloped areas to receiving paper, and developing the transferred image. {dǎ'fū·zhān ,trānz·fər ,prəs·əs }

diffusion transistor [ELECTR] A transistor in which the flow of current is a result of diffusion of carriers, donors, or acceptor ions in a junction transistor. {dǎ'fū·zhān ,trānz·zī·stər }

diffusion velocity [FL MECH] 1. The relative mean molecular velocity of a selected gas undergoing diffusion in a gas atmosphere, commonly taken as a nitrogen (N_2) atmosphere, a molecular phenomenon that depends upon the gas concentration as well as upon the pressure and temperature conditions present. 2. The velocity or speed with which a turbulent diffusion process proceeds as evidenced by the motion of individual eddies. {dǎ'fū·zhān ,və'ləs·əd·ē }

diffusion welding [MET] A welding process which uses high temperatures and pressures to coalesce the faying surfaces by solid-state bonding; there is no physical movement, deformation of the parts involved, or melting. {dǎ'fū·zhān ,weld·īng }

diffusiophoresis [CHEM ENG] A process in which a solid particle is moved by water vapor moving toward the cold water surface. {dǎ'fū·zhān ,zē·ə·fə're'səs }

diffusive equilibrium [METEOROL] The steady state resulting from the diffusion process, primarily of interest in the study of external forces and sources and sinks exist within the atmosphere such a state the constituent gases of the atmosphere would be distributed independently of each other, the heavier gases more rapidly with height than the lighter; but the presence of turbulent mixing precludes establishment of complete diffusive equilibrium. {dǎ'fū·zhān ,ē·kwə'lib·rē·əm }

diffusivity [PHYS] See diffusion coefficient. [M]

as singular point of a function. [METEOROL] A characteristic meteorological condition which tends to occur on or near a specific calendar date more frequently than chance would indicate; an example is the January thaw. [RELAT] A region of space-time where one or more components of the Riemann curvature tensor becomes infinite. [ˈsɪŋˌɡjəˈlærədɪt]

singularity theorems [RELAT] Theorems proving that singularities must develop in certain space-times, such as the universe, given only broad conditions, such as causality, and the existence of a trapped surface. [ˈsɪŋˌɡjəˈlærədɪtθɪrəmz]

singular matrix [MATH] A matrix which has no inverse; equivalently, its determinant is zero. [ˈsɪŋˌɡjəˈlærˌmætɪks]

singular point [MATH] 1. For a differential equation, a point that is a singularity for at least one of the known functions appearing in the equation. 2. A point on a curve at which the curve possesses no smoothly turning tangent, or crosses or touches itself, or has a cusp or isolated point. 3. A point on a surface whose coordinates, x , y , and z , depend on the parameters u and v , at which the Jacobians $D(x,y)/D(u,v)$, $D(y,z)/D(u,v)$, and $D(z,x)/D(u,v)$ all vanish. 4. See singularity. [ˈsɪŋˌɡjəˈlærˌpɔɪnt]

singular solution [MATH] For a differential equation, a solution that is not generic, that is, not obtainable from the general solution. Also known as singular integral. [ˈsɪŋˌɡjəˈlærˌsəˈljuːʃən]

singular transformation [MATH] A linear transformation which has no corresponding inverse transformation. [ˈsɪŋˌɡjəˈlærˌtranzˌfɔːrməˈʃən]

singular values [MATH] For a matrix A these are the positive square roots of the eigenvalues of A^*A , where A^* denotes the adjoint matrix of A . [ˈsɪŋˌɡjəˈlærˌvælˌyʊz]

singultus [MED] A repeated involuntary spasmodic contraction of the diaphragm followed by sudden closures of the glottis. Also known as hiccup. [ˈsɪŋˌɡʊlˌtəs]

sinh See hyperbolic sine. [ˈsɪnˌæʃ]

sinhalite [MINERAL] $MgAl(BO_3)$ A mineral composed of magnesium aluminum borate; sometimes used as a gem. [ˈsɪnˌəˌlɪt]

sinistral fault See left lateral fault. [ˈsɪnˌəˌstrəlˌfɔːlt]

sinistral fold [GEOL] An asymmetric fold whose long limb, when viewed along its dip, appears to have a leftward offset. [ˈsɪnˌəˌstrəlˌfɔːld]

sinistorse [BIOL] Twisting or coiling counterclockwise. [ˈsɪnˌəˌstrɔːs]

sinistorse curve See left-handed curve. [ˈsɪnˌəˌstrɔːsˌkərv]

sinistorsum See left-handed curve. [ˈsɪnˌəˌstrɔːsəm]

sink [COMMUN] Equipment at the end of a communications channel that receives signals and may perform other functions such as error detection. [ELECTROMAG] The region of a Rieke diagram where the rate of change of frequency with respect to phase of the reflection coefficient is maximum for an oscillator; operation in this region may lead to unsatisfactory performance by reason of cessation or instability of oscillations. [GEOL] 1. A circular or ellipsoidal depression formed by collapse on the flank of or near to a volcano. 2. A slight, low-lying desert depression containing a central playa or saline lake with no outlet, as where a desert stream comes to an end or disappears by evaporation. [MIN ENG] 1. To excavate strata downward in a vertical line for the purpose of winning and working minerals. 2. To drill or put down a shaft or borehole. [PHYS] A device or system where some extensive entity is absorbed, such as a heat sink, a sink flow, a load in an electrical circuit, or a region in a nuclear reactor where neutrons are strongly absorbed. [ˈsɪŋk]

sinker [MIN ENG] 1. A person who sinks mine shafts and puts in framing. 2. A special movable pump used in shaft sinking. 3. See sinker drill. [ˈsɪŋˌkər]

sinker bar [MIN ENG] A short, heavy rod placed above the drill jars to increase the effect of the upward sliding jars in well-drilling with cable tools. [ˈsɪŋˌkərˌbær]

sinker drill [MIN ENG] A jackhammer type of rock drill used in shaft sinkings. Also known as sinker. [ˈsɪŋˌkərˌdrɪl]

sink-float separation process [ENG] A simple gravity process used in ore dressing that separates particles of different sizes or composition on the basis of differences in specific gravity. [ˈsɪŋkˌflɔtˌsepˌəˈræʃənˌprɒsəs]

sink flow [FL-MECH] 1. In three-dimensional flow, a point into which fluid flows uniformly from all directions. 2. In

two-dimensional flow, a straight line into which fluid flows uniformly from all directions at right angles to the line. [ˈsɪŋkˌfləʊ]

sinkhead See feedhead. [ˈsɪŋkˌhed]

sinkhole [GEOL] Closed surface depressions in regions of karst topography produced by solution of surface limestone or the collapse of cavern roofs. [ˈsɪŋkˌhɒl]

sinkhole plain [GEOL] A regionally extensive plain or plateau characterized by well-developed karst features. [ˈsɪŋkˌhɒlˌplæn]

sinking [OCEANOGR] The downward movement of surface water generally caused by converging currents or when a water mass becomes denser than the surrounding water. Also known as downwelling. [OPTICS] In atmospheric optics, a refraction phenomenon, the opposite of looming, in which an object on, or slightly above, the geographic horizon apparently sinks below it. [ˈsɪŋkɪŋ]

sinking-and-walling scaffold [MIN ENG] A platform designed for use in shaft sinking to enable sinking and walling to be performed simultaneously. Also known as Galloway sinking and walling stage. [ˈsɪŋkɪŋənˌwɔːlɪŋˌskaˌfɔld]

sinking bucket See hopbit. [ˈsɪŋkɪŋˌbʌkət]

sinking fund [IND ENG] A fund established by periodically depositing funds at compound interest in order to accumulate a given sum at a given future time for some specific purpose. [ˈsɪŋkɪŋˌfʌnd]

sinking pump [MIN ENG] A long, narrow, electrically driven centrifugal-type pump designed for keeping a shaft dry during sinking operations. [ˈsɪŋkɪŋˌpʌmp]

sinking tubing [MET] Drawing tubing through a die or passing it through rolls without the use of a tool in the bore to control the inside diameter. [ˈsɪŋkɪŋˌtʊbɪŋ]

sink mark [ENG] A shallow depression or dimple on the surface of an injection-molded plastic part due to collapsing of the surface following local internal shrinkage after the gate seals. [ˈsɪŋkˌmɑːrk]

sinoatrial node [ANAT] A bundle of Purkinje fibers located near the junction of the superior vena cava with the right atrium which acts as a pacemaker for cardiac excitation. Abbreviated SA node. Also known as sinoauricular node. [ˈsɪˌnəˌəˌtriːəlˌnɒd]

sinoauricular node See sinoatrial node. [ˈsɪˌnəˌəˌrɪkˌyəˌlərˌnɒd]

sinolite [MINERAL] Si_3N_2O A nitride mineral known only in meteorites. [ˈsɪnˌəˌlɪt]

Sinope [ASTRON] A small satellite of Jupiter with a diameter of about 17 miles (27 kilometers), orbiting with retrograde motion at a mean distance of about 1.47×10^7 miles (2.37×10^7 kilometers). Also known as Jupiter IX. [ˈsɪnˌəˌpɛ]

sinople [MINERAL] A blood-red or brownish-red (with a tinge of yellow) variety of quartz containing inclusions of hematite. [ˈsɪnˌəˌpəl]

sinter [MET] 1. The product of a sintering operation. 2. A shaped body composed of metal powders and produced by sintering with or without previous compacting. [MINERAL] See siliceous sinter. [PETR] A chemical sedimentary rock deposited by precipitation from mineral waters, especially siliceous sinter and calcareous sinter. [ˈsɪnˌtər]

sintered copper [MET] Copper prepared by heating a compressed powder of the metal to form a solid mass. [ˈsɪnˌtərdˌkæpər]

sintered steel [MET] Steel prepared by heating compressed iron powder and graphite to form a solid. [ˈsɪnˌtərdˌstiːl]

sintering [MET] Forming a coherent bonded mass by heating metal powders without melting; used mostly in powder metallurgy. [ˈsɪnˌtərɪŋ]

sintering furnace [MET] A furnace in which presintering and sintering operations are carried out. [ˈsɪnˌtərɪŋˌfʌˌnəs]

sinter setting See mechanical setting. [ˈsɪnˌtərˌsedɪŋ]

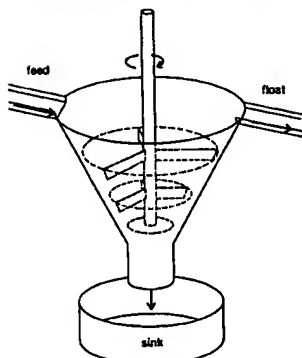
sinuate [BOT] Having a wavy margin with strong indentations. [ˈsɪnˌyəˌweɪt]

sinus [BIOL] A cavity, recess, or depression in an organ, tissue, or other part of an animal body. [ˈsɪˌnəs]

sinus gland [INV ZOO] An endocrine gland in higher crustaceans, lying in the eyestalk in most stalk-eyed species, which is the site of storage and release of a molt-inhibiting hormone. [ˈsɪˌnəsˌɡlænd]

sinus hairs See vibrissae. [ˈsɪˌnəsˌhɛrz]

SINK-FLOAT SEPARATION PROCESS



Feed particles are introduced into suspension, whose specific gravity is between that of mineral and gangue particles; particles of higher specific gravity sink while those of lower specific gravity float; stirrer prevents suspension from setting out on the walls.